

WHAT IS CLAIMED IS:

1. A ceramic compositions, which comprises:
 1. at least about 91 mole % zirconia; and
 2. a stabilizing amount up to about 9 mole % of a stabilizer component comprising:
 - a. a first metal oxide selected from the group consisting of yttria, calcia, ceria, scandia, magnesia, india and mixtures thereof; and
 - b. a second metal oxide of a trivalent metal atom selected from the group consisting of lanthana, gadolinia, neodymia, samaria, dysprosia, erbia, ytterbia, and mixtures thereof.
2. The composition of claim 1 which comprises from about 92 to about 95 mole % zirconia and from about 5 to about 8 mole % stabilizing component.
3. The composition of claim 2 wherein the first metal oxide is yttria in amount of from about 3 to about 5 mole % and wherein the second metal oxide is selected from the group consisting of lanthana, gadolinia, ytterbia and mixtures thereof in an amount of from about 0.5 to about 4 mole %.
4. The composition of claim 3 which has a mole % ratio of second metal oxide to total stabilizing component of from about 0.1 to about 0.5.
5. The composition of claim 4 wherein the ratio of second metal oxide to total stabilizing component is from about 0.15 to about 0.35.
6. The composition of claim 5 wherein the second metal oxide is lanthana.
7. The composition of claim 6 wherein the ratio of lanthana to total stabilizing component is from about 0.2 to about 0.3.
8. A thermally protected article, which comprises:

- A. a metal substrate; and
- B. a thermal barrier coating comprising:
 - 1. at least about 91 mole % zirconia; and
 - 2. a stabilizing amount up to about 9 mole % of a stabilizer component comprising:
 - a. a first metal oxide selected from the group consisting of yttria, calcia, ceria, scandia, magnesia, india and mixtures thereof; and
 - b. a second metal oxide of a trivalent metal atom selected from the group consisting of lanthana, gadolinia, neodymia, samaria, dysprosia, erbia, ytterbia, and mixtures thereof.

9. The article of claim 8 which further comprises a bond coat layer adjacent to and overlaying the metal substrate and wherein the thermal barrier coating is adjacent to and overlies the bond coat layer.

10. The article of claim 9 wherein the thermal barrier coating has a thickness of from about 1 to about 100 mils.

11. The article of claim 10 wherein the thermal barrier coating has a strain-tolerant columnar structure.

12. The article of claim 11 wherein the thermal barrier coating comprises from about 92 to about 95 mole % zirconia and from about 5 to about 8 mole % total stabilizing component.

13. The article of claim 11 wherein the first metal oxide is yttria in amount of from about 3 to about 5 mole % of the thermal barrier coating and wherein the second metal oxide is selected from the group consisting of lanthana, gadolinia, ytterbia and mixtures thereof in an amount of from about 0.5 to about 4 mole % of the thermal barrier coating.

14. The article of claim 13 wherein the thermal barrier coating has a mole % ratio of second metal oxide to total stabilizing component of from about 0.1 to about 0.5.

15. The article of claim 14 wherein the ratio of second metal oxide to total stabilizing component is from about 0.15 to about 0.35.
16. The article of claim 15 wherein the second metal oxide is lanthana.
17. The article of claim 16 wherein the ratio of lanthana to total stabilizing component is from about 0.2 to about 0.3.
18. The article of claim 11 which is a turbine engine component.
19. The article of claim 18 which is a turbine shroud and wherein the thermal barrier coating has a thickness of from about 30 to about 70 mils.
20. The article of claim 18 which is a turbine airfoil and wherein the thermal barrier coating has a thickness of from about 3 to about 15 mils.
21. A method for preparing a thermal barrier coating on an underlying metal substrate, the method comprising the step of:
 - A. forming a thermal barrier coating over the metal substrate by depositing a ceramic composition, which comprises:
 1. at least about 91 mole % zirconia; and
 2. a stabilizing amount up to about 9 mole % of a stabilizer component comprising:
 - a. a first metal oxide selected from the group consisting of yttria, calcia, ceria, scandia, magnesia, india and mixtures thereof; and
 - b. a second metal oxide of a trivalent metal atom selected from the group consisting of lanthana, gadolinia, neodymia, samaria, dysprosia, erbia, ytterbia, and mixtures thereof.
22. The method of claim 21 wherein a bond coat layer is adjacent to and overlies the metal substrate and wherein the thermal barrier coating is formed on the bond coat layer.

23. The method of claim 22 wherein the ceramic composition is deposited by physical vapor deposition to form a thermal barrier coating having a strain-tolerant columnar structure.
24. The method of claim 23 wherein the ceramic composition that is deposited comprises from about 92 to about 95 mole % zirconia and from about 5 to about 8 mole % total stabilizing component.
25. The method of claim 24 wherein the ceramic composition that is deposited comprises yttria as the first metal oxide in amount of from about 3 to about 5 mole % and a second metal oxide selected from the group consisting of lanthana, gadolinia, ytterbia and mixtures thereof in an amount of from about 0.5 to about 4 mole %.
26. The method of claim 25 wherein the ceramic composition that is deposited has a mole % ratio of second metal oxide to total stabilizing component of from about 0.1 to about 0.5.
27. The method of claim 26 wherein the ceramic composition that is deposited has a mole % ratio of second metal oxide to total stabilizing component is from about 0.15 to about 0.35.
28. The method of claim 27 wherein the ceramic composition that is deposited comprises lanthana as the second metal oxide in a mole % ratio of lanthana to total stabilizing component is from about 0.2 to about 0.3.